

WHAT IS CLAIMED IS:

1. A printing material container detachably attached to a printing apparatus having a clock signal line, a data signal line, and a reset signal line, said printing material container comprising:

- a reservoir unit that keeps a printing material therein;
- a clock terminal that receives a clock signal sent via the clock signal line of said printing apparatus;
- a data terminal that transmits a data signal to and from the data signal line of said printing apparatus;
- 10 a reset terminal that receives a reset signal sent via the reset signal line of said printing apparatus;
- a storage element having a plurality of non-volatile storage areas that are sequentially accessed; and
- 15 a storage element control unit that is initialized at a first level of the input reset signal and carries out a writing/reading operation of data into and from the storage element according to the data signal synchronously with the input clock signal when the reset signal is switched over to a second level.

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2. A printing material container in accordance with claim 1, wherein data are written into the storage element bit by bit.

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3. A printing material container in accordance with claim 1, wherein the storage element stores identification information therein, and the storage element control unit comprises:

a data bus that connects the data terminal with the storage element;

an address counter that increments a count thereon synchronously with the clock signal input via the clock terminal and

5 resets the count to an initial value in response to input of the reset signal via the reset terminal;

an input-output controller that is electrically connected with both the storage element and the data bus and controls a direction of data transfer with regard to the storage element as well as a direction of

10 data transfer with regard to the data bus;

a comparator that compares printing material container identification information, which is assigned to said printing material container for identification thereof and is input via the data bus, with identification information stored in the storage element to determine

15 coincidence or incidence of the two pieces of identification information; and

a write/read enable unit that allows the writing/reading operation of data into and from the storage element according to the data signal in the case of coincidence of the two pieces of identification

20 information.

4. A printing material container in accordance with claim 3, wherein the input-output controller sets the direction of data transfer with regard to the storage element to a reading direction and cuts off

25 connection with the data bus as initial settings, in response to input of the reset signal.

5. A printing material container in accordance with claim 4, said

printing material container further comprising:

a command decoder that connects with the data bus and the comparator, analyzes a write/read command input via the data bus when a result of the determination by the comparator represents

5 coincidence of the printing material container identification information with the identification information stored in the storage element, and requires the input-output controller to switch over the direction of data transfer with regard to the data bus based on a result of the analysis,

wherein the input-output controller keeps the initial settings for

10 the direction of data transfer with regard to the storage element and the cutoff state of connection with the data bus until the command decoder completes the analysis of the write/read command.

6. A printing material container in accordance with claim 5, said

15 printing material container further comprising:

a test terminal that connects with a test mode signal line; and

a test mode controller that connects with the test terminal and detects input of a test mode signal,

wherein the storage element has a specific section between a head

20 position and a predetermined position of the storage area, the specific section being subjected to a writing operation under a predetermined condition and otherwise storing the identification information in an unrewritable manner, and

the predetermined condition is detection of input of the test mode

25 signal.

7. A printing material container in accordance with claim 6,

wherein the test mode controller outputs a test mode command to the command decoder for analysis thereof when detecting the input of the test mode signal, and prohibits increment of the count on the address counter until the command decoder completes the analysis of the test mode command,

the command decoder requires the input-output controller to carry out a writing operation into the storage element and release of the data bus after the analysis of the test mode command, and

the input-output controller carries out the writing operation into the storage element and the release of the data bus in response to the requirement from the command decoder.

8. A printing material container in accordance with claim 6, wherein the test mode controller outputs a test mode command to the command decoder for analysis thereof when detecting the input of the test mode signal, and prohibits increment of the count on the address counter until the command decoder completes the analysis of the test mode command,

the command decoder requires the input-output controller to carry out a reading operation from the storage element and release of the data bus after the analysis of the test mode command, and

the input-output controller carries out the reading operation from the storage element and the release of the data bus in response to the requirement from the command decoder.

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9. A printing material container in accordance with claim 3, wherein the storage element has a writable data area, in which data are writable, after a storage area of the identification information.

10. A printing material container in accordance with claim 9,
wherein data regarding at least a quantity of the printing material is
written into the writable data area.

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11. A printing material container in accordance with claim 9,
wherein the storage element has a specific section between a head
position and a predetermined position of the storage area, the specific
section being subjected to a writing operation under a predetermined
10 condition and otherwise storing the identification information in an
unrewritable manner.

12. A non-volatile storage device that is detachably attached to
a printing material container and connects with a clock signal line, a
15 data signal line, and a reset signal line, said storage device comprising:

 a storage element having a plurality of non-volatile storage
 areas that are sequentially accessed; and

 a storage element control unit that is initialized at a first level of
 an input reset signal and carries out a writing/reading operation of data
20 into and from the storage element according to a data signal
 synchronously with an input clock signal when the reset signal is
 switched over to a second level.

13. A storage device in accordance with claim 12, wherein data

25 are written into the storage element bit by bit.

14. A storage device in accordance with claim 12, wherein the

storage element stores identification information therein, and the storage element control unit comprises:

 a data bus that connects the data signal with the storage element;

5 an address counter that increments a count thereon synchronously with the input clock signal and resets the count to an initial value in response to input of the reset signal;

 an input-output controller that is interposed between the storage element and the data bus and controls a direction of data transfer with
10 regard to the storage element as well as a direction of data transfer with regard to the data bus;

 a comparator that compares printing material container identification information, which is assigned to said printing material container for identification thereof and is input via the data bus, with
15 identification information stored in the storage element to determine coincidence or incoincidence of the two pieces of identification information; and

 a write/read enable unit that allows the writing/reading operation of data into and from the storage element according to the data signal
20 in the case of coincidence of the two pieces of identification information.

15. A storage device in accordance with claim 14, wherein the input-output controller sets the direction of data transfer with regard to
25 the storage element to a reading direction and cuts off connection with the data bus as initial settings, in response to input of the reset signal.

16. A storage device in accordance with claim 15, said storage device further comprising:

a command decoder that connects with the data bus and the comparator, analyzes a write/read command input via the data bus

5 when a result of the determination by the comparator represents coincidence of the printing material container identification information with the identification information stored in the storage element, and requires the input-output controller to switch over the direction of data transfer with regard to the data bus based on a result of the analysis,

10 wherein the input-output controller keeps the initial settings for the direction of data transfer with regard to the storage element and the cutoff state of connection with the data bus until the command decoder completes the analysis of the write/read command.

15 17. A storage device in accordance with claim 14, wherein the storage element has a writable data area, in which data are writable, after a storage area of the identification information.

20 18. A storage device in accordance with claim 17, wherein the storage element has a specific section between a head position and a predetermined position of the storage area, the specific section being subjected to a writing operation under a predetermined condition and otherwise storing identification information in an unrewritable manner.

25 19. A plurality of printing material containers, each comprising a non-volatile storage device that is mounted thereon and connects with a control unit via a bus with a clock terminal, a data terminal, and a reset terminal, said control unit comprising a clock signal generation

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circuit that generates a clock signal, a reset signal generation circuit that generates a reset signal, an identification information output circuit that outputs identification information to identify a desired printing material container among said plurality of printing material containers,

5 and a data output circuit that transmits a data array including the output identification information and a write/read command to a data signal line synchronously with the clock signal,

each of said printing material containers comprising:

a data bus that connects with the data terminal;

10 a storage element that stores a different piece of identification information assigned to said each printing material container and has a storage area sequentially accessed;

a comparator that connects with the data bus and compares the identification information output from said control unit with the

15 identification information stored in the storage element to determine coincidence or incoincidence of the two pieces of identification information:

an input-output controller that is interposed between the storage element and the data bus and controls a direction of data transfer with

20 regard to the storage element as well as a direction of data transfer with regard to the data bus; and

a command decoder that connects with the data bus and the comparator, analyzes the write/read command input via the data bus when a result of the determination by the comparator represents

25 coincidence of the identification information output from said control unit with the identification information stored in the storage element, and requires the input-output controller to switch over the direction of data transfer with regard to the data bus based on a result of the

analysis.

20. A plurality of printing material containers in accordance with claim 19, each of said printing material containers further comprising:

5 an address counter that increments a count thereon synchronously with the clock signal input via the clock terminal to specify a position in the storage area of the storage element to be accessed, and resets the count to an initial value at a time of initialization,

10 wherein the input-output controller sets the direction of data transfer with regard to the storage element to a reading direction and prohibits data transfer with regard to the data bus as initial settings, and maintains the initial settings until the command decoder completes the analysis of the write/read command.

15 21. A plurality of printing material containers in accordance with claim 19, wherein the comparators of the respective storage devices have common identification information common to all said storage devices.

20 22. A plurality of printing material containers in accordance with claim 19, wherein a power supply compensation circuit included in said control unit gives compensational power supply to each of said printing material containers for a predetermined time period after cutoff of

25 general power supply,

 the reset signal is generated on at least either one of an occasion of starting power supply to said control unit and an occasion

of cutoff of the power supply,

in the case of detection of input of the reset signal during a writing operation of data, transmission of the data to the data terminal is terminated immediately and preferential data is instantly transmitted

5 to the each data terminal one by one to be completely written in the predetermined time period when the power supply compensation circuit gives the compensational power supply.

23. A plurality of printing material containers in accordance with

10 claim 19, wherein the clock signal input to the clock terminal has a longer cycle in the case of input of a write command than a cycle in the case of output of a read command.

24. A plurality of printing material containers in accordance with

15 claim 19, said plurality of printing material containers being mounted on a module substrate with a printing material container detection signal line that is laid thereon to give cascade connection with each printing material container and have one grounded end and the other end connecting with said control unit,

20 wherein said control unit determines whether or not all said printing material containers are properly mounted on the module substrate, based on a value of the printing material container detection signal line.

25 25. A plurality of printing material containers in accordance with claim 24, wherein said control unit determines that all said printing material containers are mounted properly on the module substrate when the printing material container detection signal line shows a

ground voltage.

26. A plurality of printing material containers in accordance with
claim 24, wherein said control unit determines that at least one printing
5 material container is not properly mounted on the module substrate
when the printing material container detection signal line shows a
voltage other than a ground voltage.

27. A plurality of printing material containers in accordance with
10 claim 19, wherein the storage element stores a diversity of data
regarding a type of the printing material accommodated in each printing
material container.

28. A plurality of printing material containers in accordance with
15 claim 19, wherein power supply to each printing material container is
allowed only when said control unit carries out a writing/reading
operation of data.

29. A plurality of non-volatile storage devices, each connecting
20 with a control unit via a bus with a clock terminal, a data terminal, and
a reset terminal, said control unit comprising a clock signal generation
circuit that generates a clock signal, a reset signal generation circuit
that generates a reset signal, an identification information output circuit
that outputs identification information to identify a desired storage
25 device among said plurality of storage devices, and a data output
circuit that transmits a data array including the output identification
information and a write/read command to a data signal line
synchronously with the clock signal,

each of said storage devices comprising:

- a data bus that connects with the data terminal;
- a storage element that has a storage area sequentially accessed;

5 a comparator that connects with the data bus and compares the identification information output via the identification information output circuit and the data output circuit of said control unit with identification information stored in the storage element to determine coincidence or incoincidence of the two pieces of identification information;

10 an input-output controller that is interposed between the storage element and the data bus and controls a direction of data transfer with regard to the storage element as well as a direction of data transfer with regard to the data bus; and

15 a command decoder that connects with the data bus and the comparator, analyzes the write/read command input via the data bus when a result of the determination by the comparator represents coincidence of the identification information output from said control unit with the identification information stored in the storage element, and requires the input-output controller to switch over the direction of

20 data transfer with regard to the data bus based on a result of the analysis.

30. A plurality of storage devices in accordance with claim 29, said each storage device further comprising:

25 an address counter that increments a count thereon synchronously with the clock signal input via the clock terminal to specify a position in the storage area of the storage element to be accessed, and resets the count to an initial value at a time of

initialization,

wherein the input-output controller sets the direction of data transfer with regard to the storage element to a reading direction and prohibits data transfer with regard to the data bus as initial settings,

- 5 and maintains the initial settings until the command decoder completes the analysis of the write/read command.

31. A plurality of storage devices in accordance with either one of claims 29 and 30, wherein the comparators have common

- 10 identification information common to all said storage devices.

32. A plurality of storage devices in accordance with any one of claims 29 to 31, wherein a power supply compensation circuit included in said control unit gives compensational power supply to each of said 15 storage devices for a predetermined time period after cutoff of general power supply,

the reset signal is generated on at least either one of an occasion of starting power supply to said control unit and an occasion of cutoff of the power supply,

- 20 in the case of detection of input of the reset signal during a writing operation of data, transmission of the data to the data terminal is terminated immediately and preferential data is instantly transmitted to the each data terminal one by one to be completely written in the predetermined time period when the power supply compensation circuit 25 gives the compensational power supply.

33. A plurality of storage devices in accordance with any of

claims 29 to 32, wherein the clock signal input to the clock terminal has a longer cycle in the case of input of a write command than a cycle in the case of output of a read command.

5 34. A plurality of storage devices in accordance with any of claims 29 to 33, said plurality of storage devices being mounted on a module substrate with a storage device detection signal line that is laid thereon to give cascade connection with each storage device and have one grounded end and the other end connecting with said control unit,

10 wherein said control unit determines whether or not all said storage devices are properly mounted on the module substrate, based on a value of the storage device detection signal line.

15 35. A plurality of storage devices in accordance with claim 34, wherein said control unit determines that all said storage devices are mounted properly on the module substrate when the storage device detection signal line shows a ground voltage.

20 36. A plurality of storage devices in accordance with claim 34, wherein said control unit determines that at least one storage device is not properly mounted on the module substrate when the storage device detection signal line shows a voltage other than a ground voltage.

25 37. A plurality of storage devices in accordance with any of claims 29 to 36, wherein power supply to each storage device is allowed only when said control unit carries out a writing/reading operation of data.

38. A printing material container detachably attached to a printing apparatus having a clock signal line, a data signal line, and a reset signal line, said printing material container comprising:

- 5 a reservoir unit that keeps a printing material therein;
- a clock terminal connecting with the clock signal line of said printing apparatus via a bus;
- a data terminal connecting with the data signal line of said printing apparatus via the bus;
- 10 a reset terminal connecting with the reset signal line of said printing apparatus via the bus;
- a storage element that has a non-volatile storage area and is subjected to a writing/reading operation based on a clock signal input via the clock terminal and a data signal input and output via the data terminal;
- 15 a comparator that compares printing material container identification information, which is included in the data signal and assigned to said printing material container for identification thereof, with identification information stored in advance in the storage element
- 20 to determine coincidence or incoincidence of the two pieces of identification information; and
- an input-output controller that allows the writing/reading operation into and from the storage element when the comparator determines coincidence of the two pieces of identification information.

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39. A printing material container in accordance with claim 38, wherein the identification information is stored in the storage element.

40. A printing material container in accordance with claim 38,
wherein the input-output controller allows the writing/reading operation
into and from the storage element only when a reset signal input via
5 the reset terminal satisfies a predetermined condition.

41. A printing material container in accordance with claim 40,
wherein the storage element is sequentially accessed in synchronism
with the clock signal.

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42. A printing material container in accordance with claim 41,
wherein the storage element has information regarding a quantity of the
printing material kept in said printing material container, and the
identification information is stored at a specific position accessed prior
15 to the information regarding the quantity of the printing material.

43. A printing material container in accordance with any one of
claims 40 to 42, wherein the predetermined condition is that the reset
signal input via the reset terminal switches over a state thereof from a
20 first level to a second level.

44. A non-volatile storage device that connects with a clock
signal line, a data signal line, and a reset signal line and is detachably
attached to a printing material container, said storage device
25 comprising:

a storage element that has a non-volatile storage area and is
subjected to a writing/reading operation based on a clock signal input

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via the clock signal line and a data signal input and output via the data signal line;

a comparator that compares printing material container identification information, which is included in the data signal and

5 assigned to said printing material container for identification thereof, with identification information stored in advance in the storage element to determine coincidence or incoincidence of the two pieces of identification information; and

an input-output controller that allows the writing/reading

10 operation into and from the storage element when the comparator determines coincidence of the two pieces of identification information.

45. A storage device in accordance with claim 44, wherein the identification information is stored in the storage element.

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46. A storage device in accordance with claim 44, wherein the input-output controller allows the writing/reading operation into and from the storage element only when a reset signal input via the reset signal line satisfies a predetermined condition.

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47. A storage device in accordance with claim 44, wherein the storage element is sequentially accessed in synchronism with the clock signal.

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48. A storage device in accordance with claim 47, wherein the storage element has information regarding a quantity of a printing material accommodated in said printing material container, and the

identification information is stored at a specific position accessed prior to the information regarding the quantity of the printing material.

49. A storage device in accordance with any one of claims 46 to
5 48, wherein the predetermined condition is that the reset signal input via the reset signal line switches over a state thereof from a first level to a second level.

50. A storage system comprising a plurality of printing material
10 containers and a control unit, each printing material container having a non-volatile storage device that connects with a clock signal line, a data signal line, and a reset signal line via a bus and a reservoir unit that keeps a printing material therein, said control unit connecting with said storage device included in said printing material container via the
15 clock signal line, the data signal line, and the reset signal line,
said control unit comprising:
a clock signal generation circuit that generates a clock signal;
a reset signal generation circuit that generates a reset signal for initializing said storage device;
20 an identification information output circuit that outputs identification information to identify a storage device included in a desired printing material container among said plurality of printing material containers; and
a data output circuit that transmits a data array including the
25 output identification information and a write/read command to the data signal line synchronously with the clock signal,
said storage device included in said each printing material

container comprising:

a data bus that connects with the data signal line;

a storage element that has a storage area sequentially accessed;

5 a comparator that connects with the data bus and compares the identification information output from said control unit with identification information stored in the storage element to determine coincidence or incoincidence of the two pieces of identification information;

10 an input-output controller that is interposed between the storage element and the data bus and controls a direction of data transfer with regard to the storage element as well as a direction of data transfer with regard to the data bus; and
a command decoder that connects with the data bus and the comparator, analyzes the write/read command input via the data bus
15 15 when a result of the determination by the comparator represents coincidence of the identification information output from said control unit with the identification information stored in the storage element, and requires the input-output controller to switch over the direction of data transfer with regard to the data bus based on a result of the analysis.
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51. A storage system in accordance with claim 50, wherein said storage device included in said each printing material container further comprises:

25 an address counter that increments a count thereon synchronously with the clock signal input via the clock signal line to specify a position in the storage area of the storage element to be accessed, and resets the count to an initial value at a time of

initialization,

wherein the input-output controller sets the direction of data transfer with regard to the storage element to a reading direction and prohibits data transfer with regard to the data bus as initial settings.

5 and maintains the initial settings until the command decoder completes the analysis of the write/read command.

52. A storage system in accordance with claim 50, wherein said control unit causes the reset signal generation circuit to output the

10 reset signal to the reset signal line, and

said control unit causes the data output circuit to transmit the data array including the identification information, which is assigned to said storage device included in said desired printing material container to be accessed, and the write/read command to the data signal line synchronously with the clock signal, so as to gain access to said storage device in said desired printing material container.

53. A storage system in accordance with claim 52, wherein said storage device included in each said printing material container causes

20 the address counter to reset the count thereon to the initial value in response to detection of the reset signal.

said storage device causes the comparator to compare the identification information transmitted to the data bus with the identification information stored in the storage element to determine coincidence or incoincidence of the two pieces of identification information, and

when the result of the determination by the comparator represents coincidence of the identification information transmitted to

the data bus with the identification information stored in the storage element, said storage device causes the command decoder to analyze the write/read command transmitted to the data bus, controls the data transfer with regard to the data bus and the data transfer with regard to

5 the storage element based on the result of the analysis, and carries out either one of an operation of writing data at a desired position in the storage element and an operation of reading data from the storage element.

10 54. A storage system in accordance with claim 53, wherein the identification information output circuit of said control unit outputs common identification information common to all said storage devices, and

the comparator of each storage device stores the common

15 identification information therein.

55. A storage system in accordance with any one of claims 50 to 54, wherein said control unit further comprises a power supply compensation circuit that gives compensational power supply for a

20 predetermined time period after cutoff of general power supply,

the reset signal generation circuit included in said control unit generates the reset signal on at least either one of an occasion of starting power supply to said control unit and an occasion of cutoff of the power supply, and

25 in response to detection of the reset signal during a writing operation of data, the data output circuit included in said control unit immediately terminates transmission of the data and instantly transmits preferential data to be completely written in the predetermined time

period when the power supply compensation circuit gives the compensational power supply.

56. A storage system in accordance with any one of claims 50 to 55,
5 wherein the clock signal generation circuit included in said control unit
lengthens a cycle of the clock signal in the case of output of a write
command via the data output circuit than a cycle in the case of output
of a read command.

10 57. A storage system in accordance with any one of claims 50 to 56,
said storage system further comprising:
a module substrate that has said plurality of storage devices mounted
thereon and a storage device detection signal line laid thereon to give
cascade connection with each storage device and have one grounded
15 end and the other end connecting with said control unit,
wherein said control unit further comprises a storage device
detection circuit that determines whether or not all said storage devices
are properly mounted on the module substrate, based on a value of the
storage device detection signal line.

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58. A storage system in accordance with claim 57, wherein the
storage device detection circuit included in said control unit determines
that all said storage devices are mounted properly on the module
substrate when the storage device detection signal line shows a ground
25 voltage.

59. A storage system in accordance with claim 57, wherein the

storage device detection circuit included in said control unit determines that at least one storage device is not properly mounted on the module substrate when the storage device detection signal line shows a voltage other than a ground voltage.

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60. A storage system in accordance with any one of claims 50 to 59, wherein said storage device stores a diversity of data regarding a type of the printing material accommodated in said each printing material container.

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61. A storage system in accordance with any one of claims 50 to 59, wherein power supply to each storage device is allowed only when said control unit carries out a writing/reading operation of data into and from said storage device.

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62. A storage system in accordance with claim 50, wherein the storage element included in said each storage device has a specific section between a head position and a predetermined position of the storage area, the specific section being subjected to a writing operation under a predetermined condition and otherwise storing the identification information in an unrewritable manner.

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25 63. A storage system in accordance with claim 50, wherein the clock signal line, the data signal line, and the reset signal line are included in a flexible cable.

64. A method of gaining access to a storage device attached to

a desired printing material container among a plurality of printing material containers, each printing material container having a non-volatile storage device that connects with a clock signal line, a data signal line, and a reset signal line via a bus and stores proper

5 identification information therein,

said method comprising the steps of:

outputting a reset signal to the reset signal line; and

transmitting a data array including identification information, which is assigned to said storage device included in said desired

10 printing material container to be accessed, and a write/read command to the data signal line synchronously with a clock signal.

65. A method of processing an access requirement in a storage device attached to a printing material container, said printing material

15 container having a storage device that includes a storage element, which has a storage area sequentially accessed and a specific section between a head position and a predetermined position of the storage area to store identification information therein, said storage device sharing a clock bus that is connected to a clock signal line, a data bus

20 that is connected to a data signal line, and a reset bus that is connected to a reset signal line with a storage device included in another printing material container,

said method comprising the steps of:

resetting a count on an address counter to an initial value in

25 response to detection of a reset signal on the reset bus;

comparing identification information transmitted to the data bus with the identification information stored in the storage element to determine coincidence or incoincidence of the two pieces of

identification information;

when the result of the determination represents coincidence of the identification information transmitted to the data bus with the identification information stored in the storage element, analyzing a

5 write/read command transmitted to the data bus;

controlling data transfer with regard to the data bus and data transfer with regard to the storage element based on the result of the analysis; and

carrying out either one of an operation of writing data at a desired

10 position in the storage element and an operation of reading data from the storage element, based on the count on the address counter.

66. In a printing material container having a non-volatile storage device, which includes a storage element sequentially accessed, a

15 method of storing identification information in a specific section located between a head position and a predetermined position of a storage area in the storage element,

said method comprising the steps of:

resetting a count on an address counter to an initial value and

20 prohibiting increment of the count synchronously with a clock signal, in response to detection of a reset signal;

setting a direction of data transfer with regard to a data bus to a writing direction and a direction of data transfer with regard to the storage element to a writing direction, in response to a write command

25 transmitted to the data bus;

allowing increment of the count on the address counter synchronously with the clock signal after completion of the settings of

the directions of data transfer; and

writing the identification information between the head position and the predetermined position of the storage area in the storage element and subsequently writing data into the storage area according

5 to the count on the address counter.

67. In a printing material container having a non-volatile storage device, which includes a storage element sequentially accessed, a method of reading data stored in a storage area of the storage element

10 from a head position of the storage area,

said method comprising the steps of:

resetting a count on an address counter to an initial value and prohibiting increment of the count synchronously with a clock signal, in response to detection of a reset signal;

15 setting a direction of data transfer with regard to a data bus to a reading direction and a direction of data transfer with regard to the storage element to a reading direction, in response to a read command transmitted to the data bus;

allowing increment of the count on the address counter

20 synchronously with the clock signal after completion of the settings of the directions of data transfer; and

reading data stored in the storage area of the storage element from the head position of the storage area according to the count on the address counter.

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68. In a printing material container having a non-volatile storage device, which includes a storage element sequentially accessed, a

method of storing identification information in a specific section located between a head position and a predetermined position of a storage area in the storage element,

 said method comprising the steps of:

5 carrying out retrieval to find a piece of identification information that coincides with the identification information stored in the storage element of said storage device;

 when the piece of identification information that coincides with the identification information stored in the storage element is found,

10 transmitting the piece of identification information and a write command to said storage device;

 transmitting a data array to said storage device, the data array including the identification information after data corresponding to an end position of the storage area in the storage element of said storage device; and

15 writing data up to the end position of the storage area in the storage element and subsequently writing the identification information from the head position to the predetermined position of the storage area in the storage element, according to a count on an address counter.

20 69. A method in accordance with any one of claims 64 to 68, said method being applied to a set of at least two printing material containers, each having said storage device that stores a different piece of identification information.

70. A method of gaining access to a desired storage device

among a plurality of non-volatile storage devices, each storage device connecting with a clock signal line, a data signal line, and a reset signal line via a bus and storing proper identification information therein,

5 said method comprising the steps of:

outputting a reset signal to the reset signal line; and

transmitting a data array including identification information, which is assigned to said desired storage device to be accessed, and a write/read command to the data signal line synchronously with a clock

10 signal.

71. A method of processing an access requirement in a storage device, said storage device having a storage element that includes a storage area sequentially accessed and a specific section between a

15 head position and a predetermined position of the storage area to store identification information therein, said storage device sharing a clock bus that is connected to a clock signal line, a data bus that is connected to a data signal line, and a reset bus that is connected to a reset signal line with another storage device,

20 said method comprising the steps of:

resetting a count on an address counter to an initial value in response to detection of a reset signal on the reset bus;

comparing identification information transmitted to the data bus with the identification information stored in the storage element to

25 determine coincidence or incidence of the two pieces of identification information;

when the result of the determination represents coincidence of

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the identification information transmitted to the data bus with the identification information stored in the storage element, analyzing a write/read command transmitted to the data bus;

controlling data transfer with regard to the data bus and data transfer

- 5 with regard to the storage element based on the result of the analysis; and

carrying out either one of an operation of writing data at a desired position in the storage element and an operation of reading data from the storage element, based on the count on the address counter.

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72. In a non-volatile storage device having a storage element sequentially accessed, a method of storing identification information in a specific section located between a head position and a predetermined position of a storage area in the storage element,

15 said method comprising the steps of:

resetting a count on an address counter to an initial value and prohibiting increment of the count synchronously with a clock signal, in response to detection of a reset signal;

20 setting a direction of data transfer with regard to a data bus to a writing direction and a direction of data transfer with regard to the storage element to a writing direction, in response to a write command transmitted to the data bus;

25 allowing increment of the count on the address counter synchronously with the clock signal after completion of the settings of the directions of data transfer; and

writing the identification information between the head position and the predetermined position of the storage area in the storage

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element and subsequently writing data into the storage area according to the count on the address counter.

73. In a non-volatile storage device having a storage element

5 sequentially accessed, a method of reading data stored in a storage area of the storage element from a head position of the storage area,

said method comprising the steps of:

resetting a count on an address counter to an initial value and prohibiting increment of the count synchronously with a clock signal, in

10 response to detection of a reset signal;

setting a direction of data transfer with regard to a data bus to a reading direction and a direction of data transfer with regard to the storage element to a reading direction, in response to a read command transmitted to the data bus;

15 allowing increment of the count on the address counter synchronously with the clock signal after completion of the settings of the directions of data transfer; and

reading data stored in the storage area of the storage element from the head position of the storage area according to the count on
20 the address counter.

74. In a non-volatile storage device having a storage element sequentially accessed, a method of storing identification information in a specific section located between a head position and a

25 predetermined position of a storage area in the storage element,

said method comprising the steps of:

carrying out retrieval to find a piece of identification information

that coincides with the identification information stored in the storage element of said storage device;

when the piece of identification information that coincides with the identification information stored in the storage element is found,

- 5 transmitting the piece of identification information and a write command to said storage device;

transmitting a data array to said storage device, the data array including the identification information after data corresponding to an end position of the storage area in the storage element of said storage

- 10 device; and

writing data up to the end position of the storage area in the storage element and subsequently writing the identification information from the head position to the predetermined position of the storage area in the storage element, according to a count on an address

- 15 counter.

75. A non-volatile storage device that connects with a clock signal line, a data signal line, and a reset signal line and is initialized in response to a reset signal input via the reset signal line,

- 20 said storage device comprising a storage element, which has a storage area sequentially accessed and a specific section between a head position and a predetermined position of the storage area, the specific section being subjected to a writing operation under a predetermined condition and otherwise storing identification information
- 25 in an unrewritable manner.

76. A printing material container detachably attached to a printing apparatus, said printing material container comprising:

a reservoir unit that keeps a printing material therein;
a storage element having a storage area of an identification information, and a writable data area, in which data are writable, after the storage area of the identification information.

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